

## DESCRIPTION OF FOUR NEW TRIASSIC UNIOS FROM THE STAKED PLAINS OF TEXAS.

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THE MATERIAL on which this paper is based was sent to the writer for examination by Prof. E. T. Dumble, State geologist of Texas.<sup>1</sup> It was obtained from the Dockum beds, an extensive formation which underlies all or nearly all the Staked Plains of Texas, and southeastern New Mexico, reaching farther back into that Territory northwest of the Plains, and having some extension under the Cretaceous area south of them in Texas. The limit of the plains on the east, north and west is marked by an escarpment, which is usually from 100 to 200, and sometimes 300 or 400 feet high. The basal portion and occasionally nearly all of this escarpment is composed of what are believed to be Triassic beds. They usually extend some 6 or 7 miles beyond the base of the great plain.<sup>2</sup>

These beds are composed of horizontal strata of sandstone, conglomerate and clay; and are overlaid in some places by Cretaceous, but more generally Tertiary strata, and underlaid by the rocks of the Permian period, whose lithological characters are so different from those believed to be Triassic that the latter can usually be recognized without trouble. The slight difference in dip, and the sudden change in lithological characters from the Triassic to the Permian, point conclusively to a break in the sedimentation of the two deposits. According to the evidence of the fossils and the characteristic material forming them, the Dockum beds seem to have been deposited in an inland, fresh-water basin. The vertebrates, as determined by Prof. E. D. Cope, were shallow fresh-water animals.

A few fragments of bivalve shells were collected by Professor Cope in the valley of Gallinas Creek, New Mexico, associated with vertebrate remains, which latter led their discoverer to believe the formation was

<sup>1</sup>The paper and the accompanying figures were prepared for the report of the Texas Geological Survey, but on account of the failure of the legislature of that State to provide funds for carrying on the investigation, the work of the Survey has come to a standstill. Through the kindness of Professor Dumble, I am permitted to publish the paper in the Proceedings of the United States National Museum.

<sup>2</sup>Third Ann. Rept. Geol. Survey of Texas, p. 227, 1891.

Triassic. Some of these fragments were described by Meek as *Unios*,<sup>1</sup> but they were in such bad condition that even a generic determination could hardly be considered certain. As the shells on which this paper is based are, I believe, undoubted *Unios*, and as it seems to be pretty well established that the strata in which they were found are Triassic, I think I need have little hesitation in saying that these are the earliest authentic specimens known of this common and widely distributed genus. I may further add that in the opinion of Dr. Charles A. White<sup>2</sup> it is quite probable that the Gallinas Creek fossils belong to the Jurassic.

Taken as a whole, these *Unios* closely resemble in form and are apparently nearly related to those of the Jurassic beds of North America, and to certain species of our Cretaceous and Tertiary formations. They can hardly be said to be very near relatives of any species at present living in the New World, though *Unio anodontoides* and one or two other allied species from the Mississippi basin have characters in common with some of them. In Europe, however, the well-known *Unio pictorum* and other somewhat similar species, as well as most of the forms found in Asia Minor, show a considerable resemblance to some of these species.

It is remarkable that there has been so little change in the species of this genus from the time when they lived in this great Triassic lake to the present day. In some cases specific descriptions of these fossils, whose age probably dates back well toward the beginning of the Mesozoic, so far as all the characters which remain are concerned, would apply almost without change to species living in the Euro-Asiatic region to-day. And Dr. White has shown that the same persistency of characters is true of a number of the forms of the Laramie group of the Cretaceous, which in all probability are the ancestors of some of our characteristic recent Mississippi Valley species, and which can hardly be separated from them.<sup>3</sup>

As he has pertinently remarked, these earliest types of *Unios* have continued almost unchanged until the present, while to-day there is not a single family of vertebrates in existence that lived in Triassic times. This wonderful persistence of *Unio* forms, and the variety of characters displayed in the species herein described, go to show that the genus must have been well established at the time the Dockum beds were deposited, and that it undoubtedly had its origin at a much earlier period, thus tending to overthrow the theory of Neumayr,<sup>4</sup> that the Unionidæ were derived from the genus *Trigonia*, which probably does not date back to a period earlier than that of the shells under consideration.

<sup>1</sup> *Unio cristonensis*, Meek, Ann. Rept. Expl. and Surv. West of One Hundredth Meridian, 1875, p. 83.

<sup>2</sup> A Review of the Non-marine Fossil Mollusca of North America, p. 425, 1883.

<sup>3</sup> A Review of the Non-marine Fossil Mollusca of North America, p. 428, 1883.

<sup>4</sup> Sitzungsber. d. k. Akad. Wiss. Wien, Math.-naturwiss. Cl., XCVIII, 1889, Heft 1-3, 1. Abth., p. 5.

The theory advanced by W. Amalsky,<sup>1</sup> that the Naiades descended from the Anthracosidæ, seems the more reasonable one, as the two families agree in many essential points of shell structure, and the latter were probably inhabitants of the fresh waters of the Carboniferous and Permian periods.

**UNIO SUBPLANATUS**, new species.

Shell rather large, somewhat triangular and compressed; growth lines strong and elevated; dorsal region and posterior slope rounded; beaks not very prominent; area of the lateral teeth strongly curved; cardinals rather wide, parallel, separated by a narrow socket. Length, 85 mm.; height, 57 mm.; diameter, 25 mm.

*Locality*.—Duck Creek, Dickens County, Texas.

Of this fine species only a single cast of a right valve of ferruginous

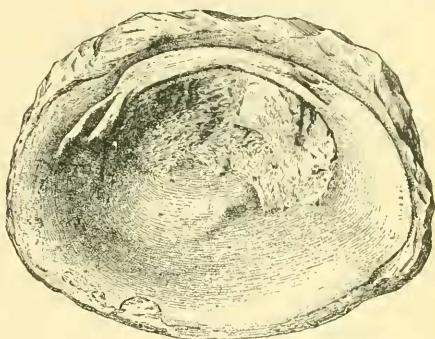


Fig. 1.

**UNIO SUBPLANATUS**, NEW SPECIES.

Internal view of right valve.

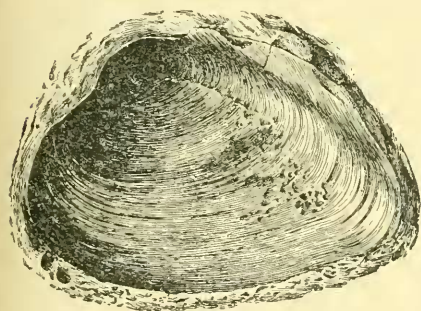


Fig. 2.

**UNIO SUBPLANATUS**, NEW SPECIES.

Cast from outside of right valve.

clay conglomerate, and what is probably a right valve of the same, badly incrustated and buried in a limestone matrix, were received. The latter, on being carefully cleaned, shows the shell to have been of moderate thickness, and to have the curious, parallel, cardinal teeth that characterize most of the Unios of the southern hemisphere to-day. The lateral teeth are shown plainly at their posterior end, but the hinge plate is so worn away and injured that they are not visible along the rest of it.

**UNIO DUMBLEI**, new species.

Shell elongated oval, widest at the region of the beaks, rounded before and behind; anterior end very short; posterior and anterior slopes elevated and almost ridgelike, with a flattened or slightly excavated area in the middle of the disc; dorsal margin rounded; base of the shell nearly straight or sometimes a little emarginate; beaks rather prominent; ligament small, but elongated; growth lines rather strong. Length, 55 mm.; height, 25 mm.; diameter, 18 mm.

<sup>1</sup>Paleontographica, XXXIX, p. 198, Stuttgart, 1892.

*Locality*.—Five miles northeast of Dockum, head of Duck Creek, Dickens County. Five pairs, more or less perfect, were sent from a

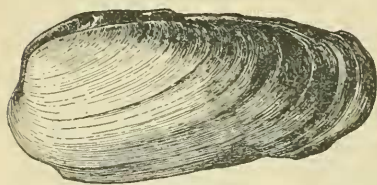


Fig. 3.

UNIO DUMBLEI, NEW SPECIES.

gray sandstone near Dockum, and what are probably three or four heavily incrustated valves of the same, from clayey conglomerate from Duck Creek. They recall quite strongly young specimens of *Unio dignatus* from Assyria, and *U. pictorum* and the allied simple forms of Europe.

#### UNIO GRACILIRATUS, new species.

Shell small, oblong oval, rounded before and slightly biangular behind; dorsal region more curved than the base; growth lines moderate; surface generally, but especially the posterior region, more or less sculptured with delicate, somewhat broken, and wavy narrow liræ. Length, 40 mm.; height, 23 mm.; diameter, 16 mm.

*Locality*.—South of spur, Headquarters 21, Dickens County, Texas; head of Duck Creek, Dickens County. Four left valves in a limestone matrix were sent from the former locality, and two left valves embedded in coarse granulated limestone from the latter. One right valve of what is probably this species was sent from the Dockum beds, at the southeast corner of Crosby County, Texas, with a number of *U. dockumensis*. Six rather imperfect specimens from the Dockum beds, in the southeast corner of Garza County, Texas, I am inclined to refer to this species, though they are less elongated and nearly all of them destitute of the peculiar sculpture of the type. In some of the specimens of this species, the liræ are quite distinct and regularly developed; in others the surface is nearly smooth; while others show slight, somewhat elongated radiating nodules.

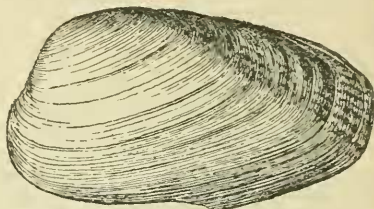


Fig. 4.

UNIO GRACILIRATUS, NEW SPECIES.

#### UNIO DOCKUMENSIS, new species.

Shell, oblong-oval, rounded before, somewhat pointed posteriorly; umbonal region quite prominent, sculptured with distinct, radiating ridges; sides rather flattened; ventral line straight or slightly incurved about the middle of the shell; ventral region rather prominent posteriorly; growth lines strong; valves solid; pallial line deeply impressed; interior bearing a ridge running diagonally from the cardinals toward the posterior basal portion, in front of which the shell is much thicker; cardinal teeth short and rather stout, laterals solid. Length, 60 mm.; height, 35 mm.; diameter, 25 mm.



Some of the specimens are considerably smaller than the above measurements, a few are a little larger, and a number seem to have been somewhat distorted by pressure. Specimens which I believe to be females are fuller in the posterior part of the ventral region than others which may be males. Two casts were found the first year in which collections were made from the Staked Plains, at a windmill three miles north of Dockum, and the name *dockumensis* was applied to these by Mr. Cummins, though he did not describe the species. On making clay casts of some of the valves sent, I was convinced that these types were the same as the more perfect specimens, and I have accordingly described the species from some of the latter.

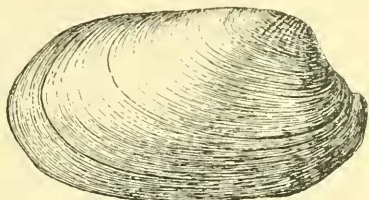


Fig. 5.

UNIO DOCKUMENSIS, NEW SPECIES.

*Locality.*—Southeast corner of Garza County, Texas; windmill 3 miles north of Dockum; tank north of Double Mountain River; head of Duck Creek, Dickens County, Texas.

An abundant and well-distributed as well as quite variable species, of which a large number of examples were sent, generally in fair condition, and composed for the most part of crystallized calcium carbonate.

In form, the species very strongly resembles the European and western Asiatic Unios of to-day, but it is remarkable in being sculptured with strong, radiating ridges on the umbonal area—a character possessed by all the recent South American species, and somewhat imperfectly by those of Australasia. The teeth, however, are very different from the teeth of these southern forms, and more nearly resemble those of the North American Jurassic and Cretaceous Unios.

Specimens of what are perhaps two other species were sent, but they are not sufficiently well preserved to describe.

To sum up, then, these Triassic Unios are evidently not the earliest members of the genus, since they show divergent characters, which are dominant in widely distributed and prominent groups of this genus found living at the present day. Thus *Unio graciliratus* in its somewhat broken and radiating lines possesses characters now found in an assemblage of peculiarly sculptured species of eastern Asia, and the teeth of *U. subplanatus* have characters like those of all or nearly all the species of the southern hemisphere. The radial beak sculpture is unknown at the present day outside of South America and Australasia, while the forms of at least three of these species, as well as their interiors, where exhibited, bring to mind most strongly the species which now inhabit Europe and western Asia, and a small group belonging to the Mississippi area.